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INSECT-FUNGAL ASSOCIATIONS

Ecology and Evolution

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Insects and fungi have a shared history of association in common habitats where they endure similar environmental conditions. Mycologists and entomologists have recognized many of these close associations, but only recently have techniques to study the intricacies of some of the associations been available. This new volume covers "seven wonders of the insect-fungus world" for which exciting new results have become available, often using methods that include phylogenetic analysis and newly designed molecular markers.

Eleven chapters of the volume are presented in two sections, "Fungi acting against insects" and "Fungi mutualistic with insects," covering a number of major themes. Necrotrophic parasites of insects are discussed, not only in the context of biological control, but also as organisms with population structure and complex multipartite interactions; the beneficial role for symptomless endophytes in broad-leaved plants is proposed; biotrophic fungal parasites with reduced morphologies are placed among their closest relatives using phylogenetic methods; complex methods of spore dispersal include fungal interactions with one or more arthropods; the farming behavior of New World attine ants, Old World fungus-growing termites, and humans provide new insights into the origin of symbioses; certain mycophagous insects have evolved to use fungi as their sole nutritional resource; and other insects obtain nutritional supplements from yeasts.

Insects involved in fungal associations include members of the Coleoptera, Diptera, Homoptera, Hymenoptera, and Isoptera, as well as others. The fungi may be clustered taxonomically, as is the case of Ascomycetes in the Hypocreales (e.g., *Beauveria*, *Metarhizium*, *Fusarium*), ambrosia fungi in the genera *Ophiostoma* and *Ceratocystis* and their asexual relatives, Laboulbeniomycetes, Saccharomycetes, and the basal Microsporidia. Other groups, however, only have occasional members (e.g., mushrooms cultivated by attine ants and termites) in such associations. The chapters included in this volume constitute a modern crash course in the study of insect-fungus associations.

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